

GE Modular Refrigerator

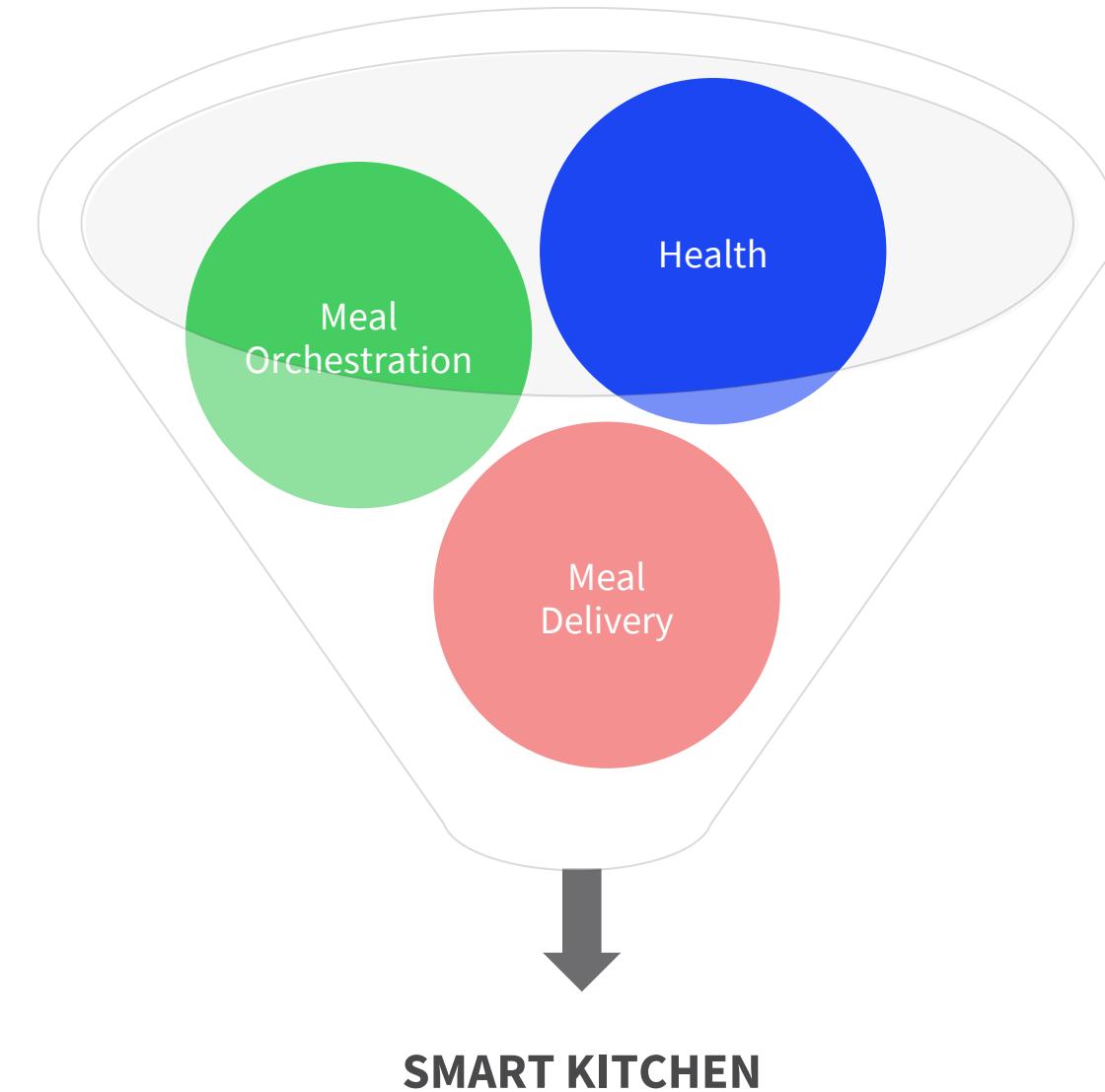
Designing an IOT based connected kitchen
appliance for shared spaces



THE PROBLEM

Design Challenge by GE Appliances

Develop a connected product and services-based business for GE Appliances, incorporating meal orchestration, health and delivery services.



USER SCENARIO

User Story



Jack, Chris, Raj. 3 people in same university are roommates
Each of them are from different country and have different food preferences



As they are busy they don't get time to cook food everyday and hence have to eat out
They want to track their food consumption & stay healthy



They keep all their food together in the fridge which causes problems like lack of space, food mixing & food getting expired as they forget about it

THE SOLUTION

Modular Refrigerator

.01

Custom Compartments

Individual portable & customizable compartments for each user

.02

Control Your Fridge

control temperature, check storage space and set power efficient mode

.03

Manage Your Food

Get information about food in your fridge, expiration and calorie count

.04

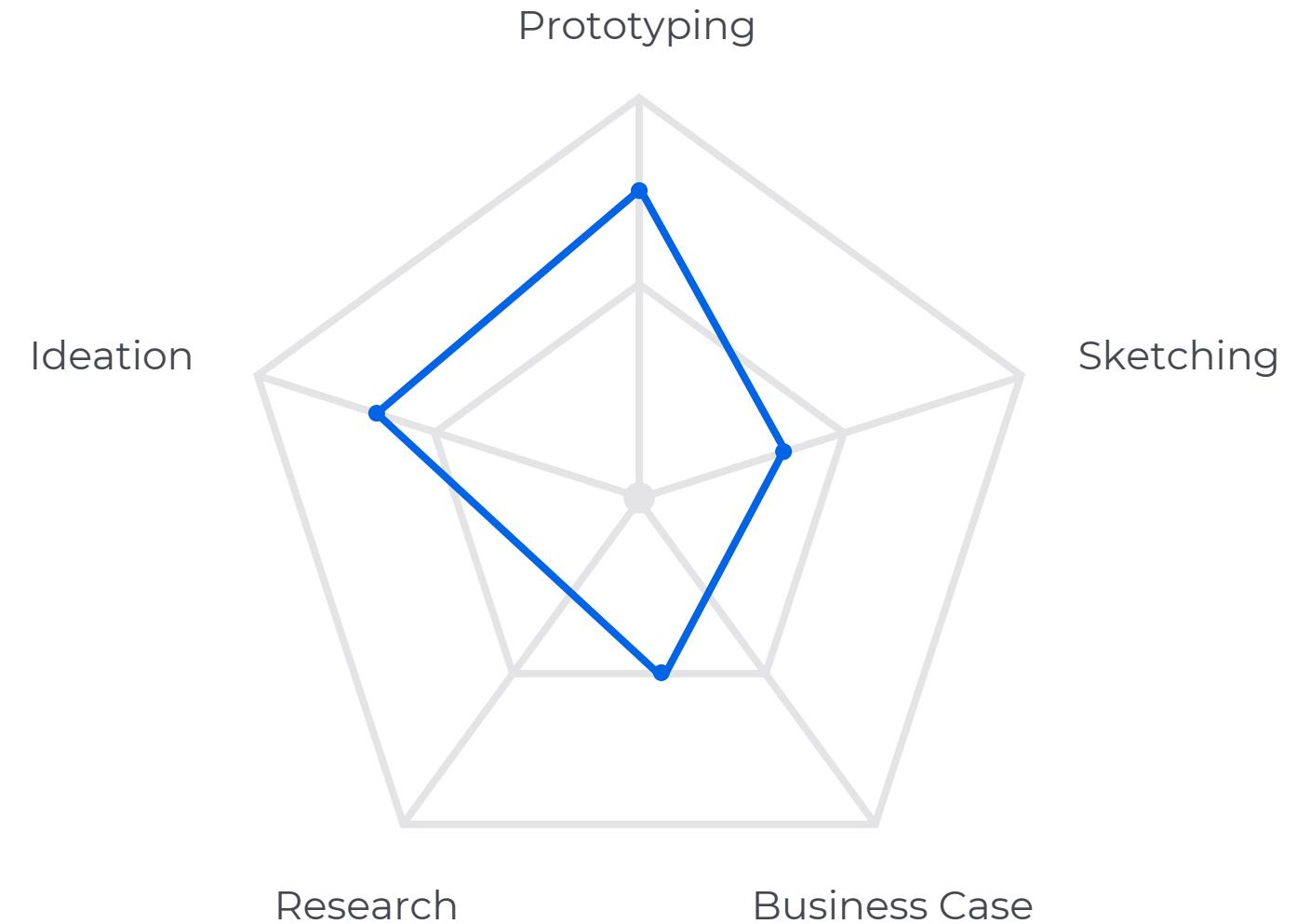
Order Meal Kits

Get recipes, order food and meal kits directly from the app



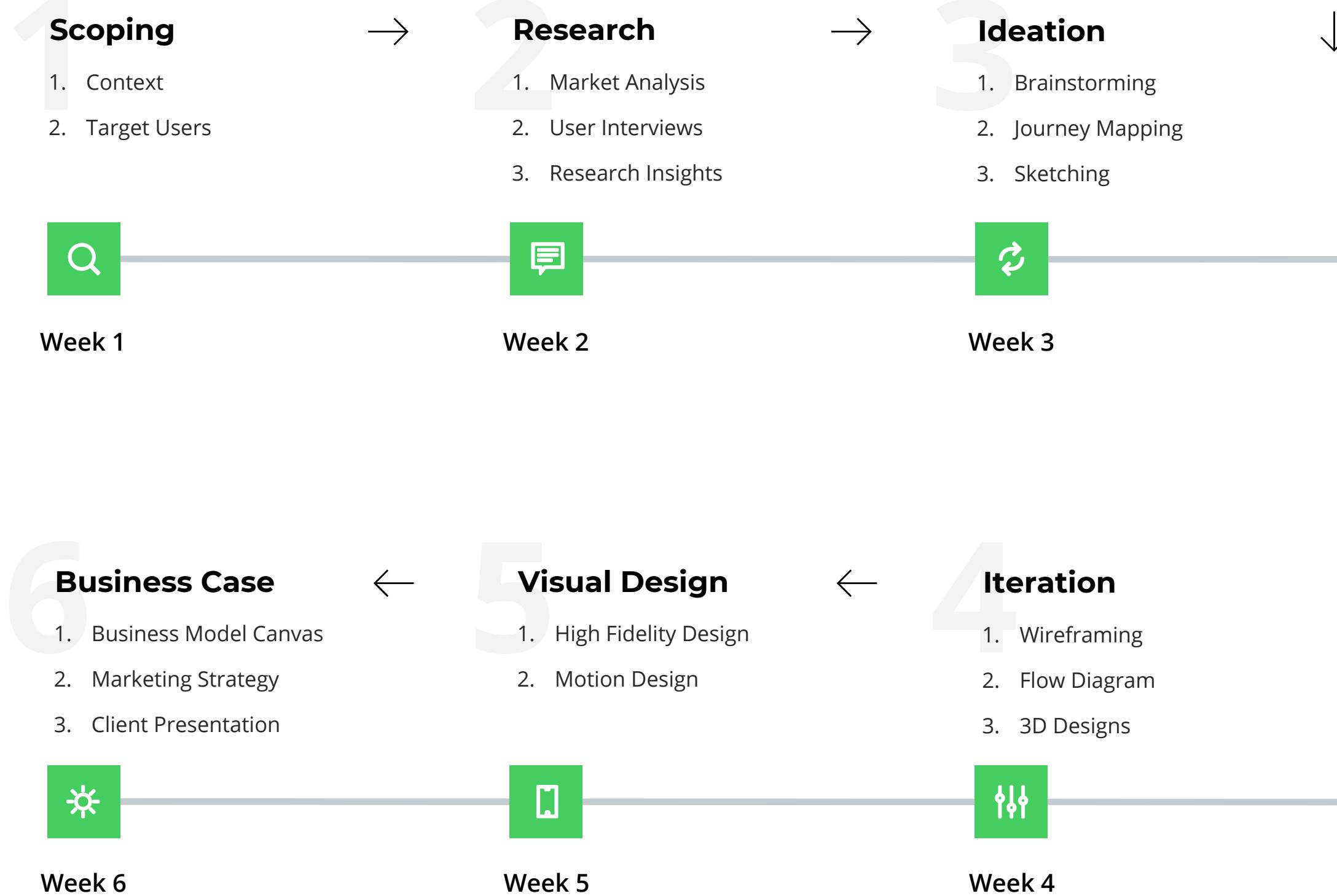
My Role

I was the **Product Designer** for this project and my responsibilities included understanding overall landscape, ideating solutions, prototyping UI, business assessment and concept validation.



PROCESS

6 WEEK DESIGN



AUDIENCE

Target Users



Students in universities

Primary user



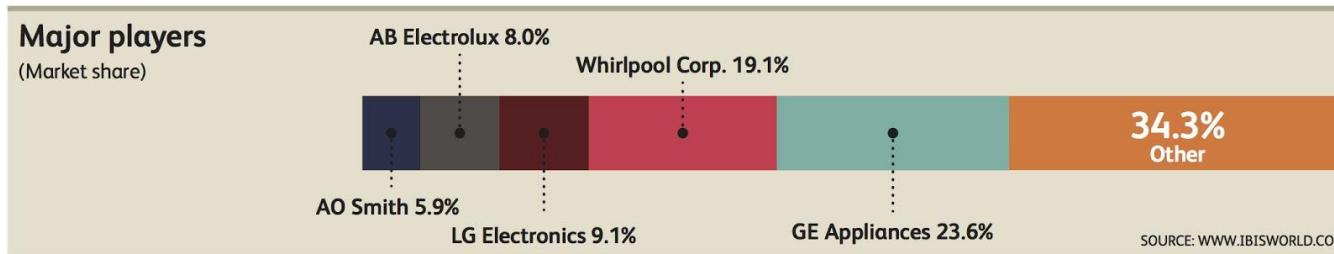
Working Professionals

Primary User

Whether in a shared space with family, friends or housemates, most kitchen appliances are used by multiple individuals

Major Companies

GE Appliances | Whirlpool Corp. | LG Electronics
AB Electrolux | AO Smith | Other Companies



Revenue
\$19.0bn

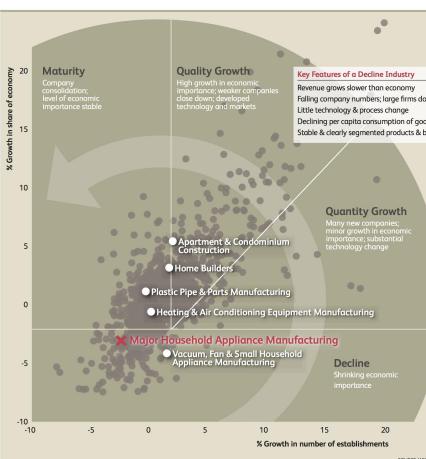
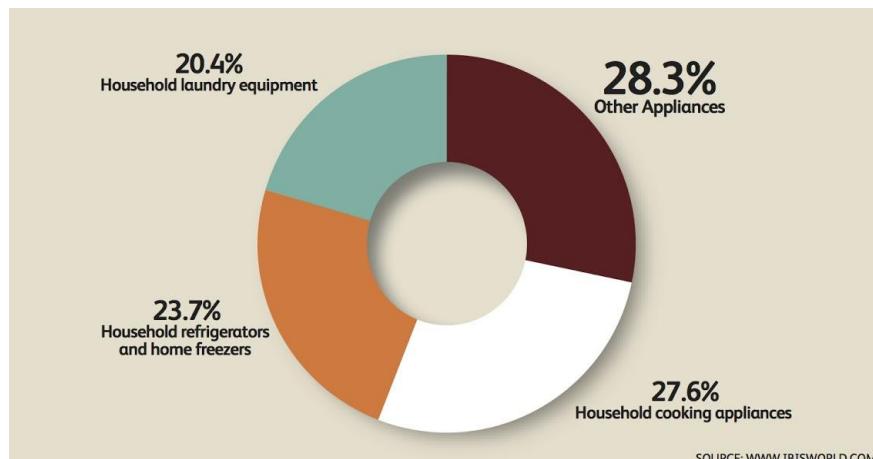
Annual Growth 12-17
2.1%

Profit
\$1.2bn

Exports
\$2.8bn

Annual Growth 17-22
1.1%

Businesses
116



Industry Structure

Life Cycle Stage	Decline	Regulation Level	Medium
Revenue Volatility	Medium	Technology Change	Medium
Capital Intensity	Medium	Barriers to Entry	High
Industry Assistance	Low	Industry Globalization	High
Concentration Level	High	Competition Level	High

UNDERSTANDING BUSINESS

Market + Competitive Analysis

1. In depth study of the business behind the appliances
2. Identifying opportunities, constraints & growth areas
3. Information about key players and how they operate
4. Understanding who are the existing customers
5. Finding untapped potential problems which we can solve

QUOTE

“As a Phd student I don't get time to cook very often, but I try to eat healthy food whenever I can..”



UNDERSTANDING USER NEEDS

User Interviews

- Conducted semi-structured with 6 individuals
- Most of them were students & working professionals, 24-35 year old
- Questions:
 - a. How do you manage your food?
 - b. What appliances do you use?
 - c. How do you track your health?
 - d. What are the major problems faced?
 - e. How do you shop groceries?

Research Finding

.01

Increase in sharing economy

The number of 25 to 34 year old living with housemates increased by a whopping 39 percent from 2005 to 2015, from 5.7 to 7.4 percent.

.03

Gap between needs & products

Large appliances are durable goods with 10+ year life-spans, but people's needs change much more quickly than their appliances do.

.02

Room for innovation

Current kitchen layouts / designs are based on acceptance of antiquated technological constraints which have created inefficiencies in power consumption and space utilization.

.04

Growing meal kit industry

Revenue growth for the Meal kit industry is expected to increase during the five years to 2022.

CHALLENGES

Problems Found



Different Dietary needs



High Upgradation costs



Old, expired or forgotten food



Lack of storage space



Lack of personalization



High energy consumption



DESIGN GOALS

Requirement Analysis



User Goals

1. Eat healthy food & stay fit
2. Cook delicious food in less time
3. Have more control on appliances
4. Track food & reduce wastage
5. Save money on new appliances



Business Goals

1. Expand sales to new user base
2. Create an ecosystem of GE products
3. Stay ahead of their competitors
4. Increase sales of bigger appliances
5. Build trust & maintain brand image



Persona

Meet Michael, he is a new undergrad student at Indiana University. He lives in a dorm room with three other roommates. All three are from different countries and have different food preferences. Michael wants to manage his grocery, save time in cooking and wants to eat healthy food. He can efficiently use all major appliances, technologies and social networks. Being a student he has constraints related to money and resources.

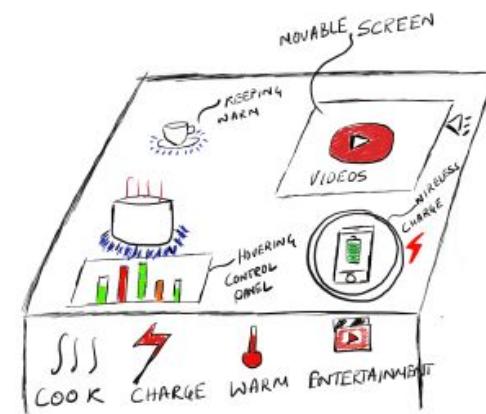
Michael Domingo

Undergrad CSE Student
Indiana university

.01	.02	.03
USER NEEDS	PROBLEMS	OPPORTUNITY
Save time	Learn cooking	Grocery Tracking
Get groceries	Knowing what to eat	Providing healthy recipe
Cook food	Getting groceries	Being aware of nutrition
Track health	Eating unhealthy	Healthy meal kits
Prep ingredients	Food wastage	Calorie tracking
Track food going bad	Manage storage	Storage space left
Personalize food	High cost of appliance	Low cost appliance

EXPLORATION

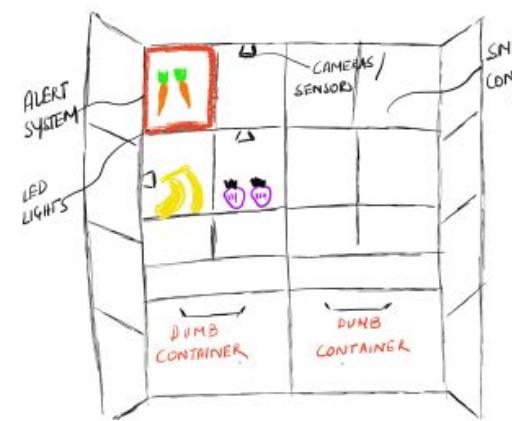
Ideation



Smart Kitchen Table

PROS
Easy to use interface while cooking & prepping meals

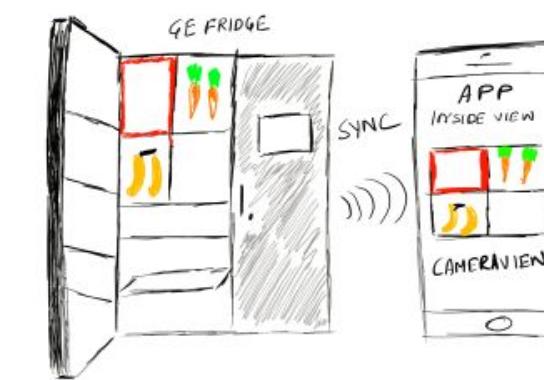
CONS
High costs and a lot of technical constraints



Smart Compartments

Smart alert system helps user to identify expired item

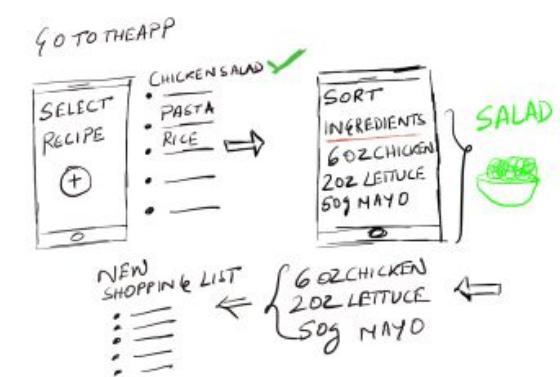
No way to let user know if they are not around fridge



Food Tracking App

Users can track their food quality and consumption

Does not solve problem of space management



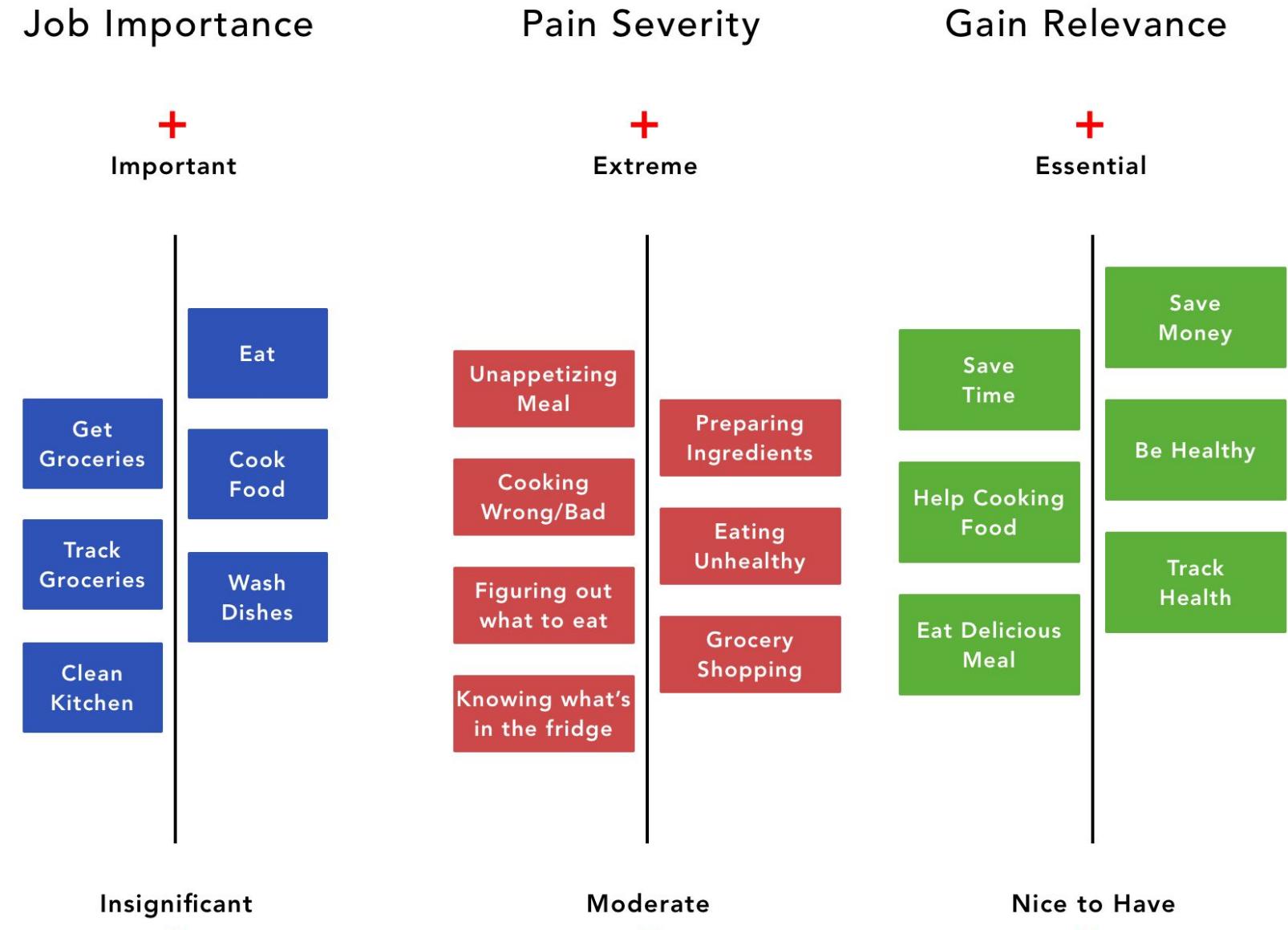
Personalized Recipes

Helps user to cook according to food available

Does not solve problems related to sharing

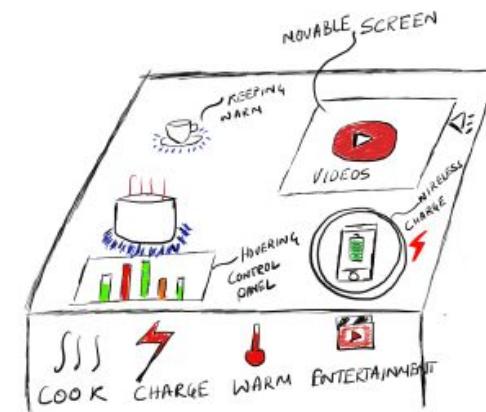
Selection Process

DEFINING FEATURES



IDEATION

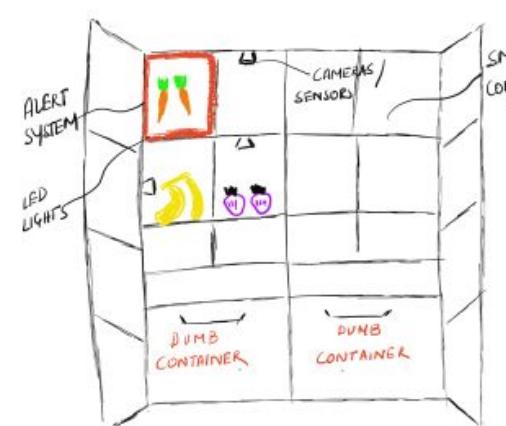
Selected Solution



Smart Kitchen Table

PROS
Easy to use interface while cooking & prepping meals

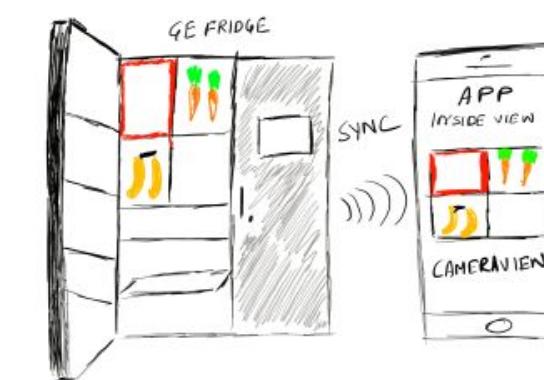
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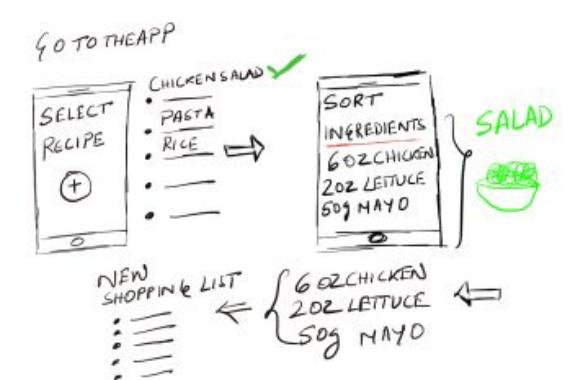
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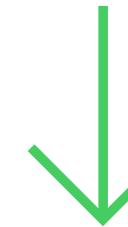
Personalized Recipes

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Feature Selection

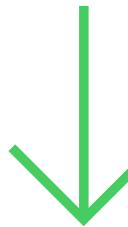
How might we improve control & sharing of fridge?



How might we help users manage their food in better way?



How might we help users find & cook healthy food?



How might we help users improve their overall health



Space Utilization

- Control temperature, set modes etc from GE app
- Get info about storage space
- View your energy consumption
- Indication for Maintenance

Prevent Wastage

- Get info about food available & expiration date
- Get recipes based on food available in your fridge

Recipe + Meal Kits

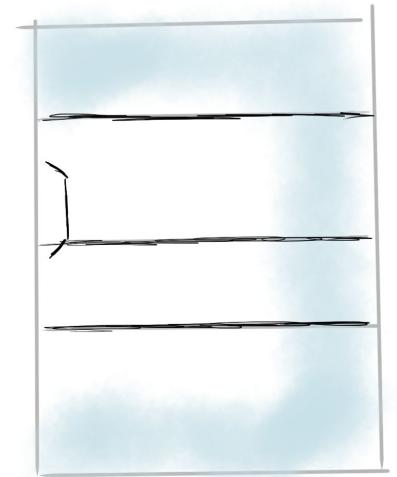
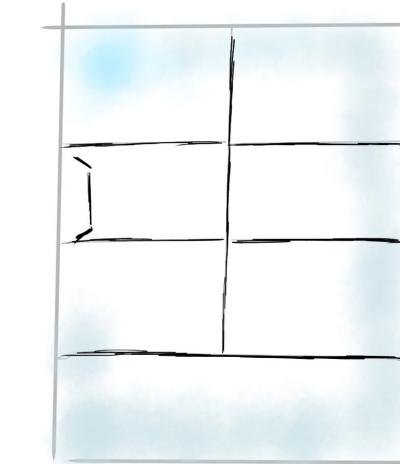
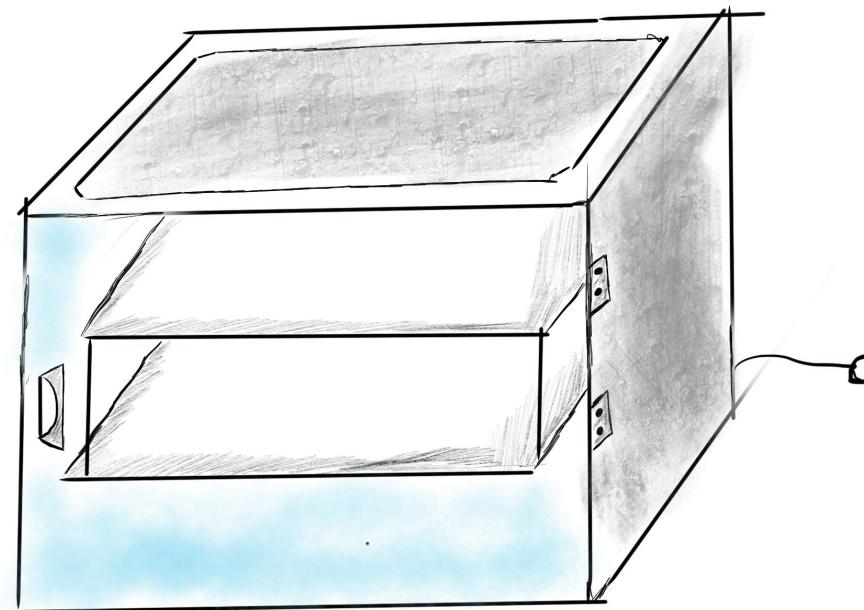
- All the food items can be ordered from the app
- Automated food delivery system

Health Tracking

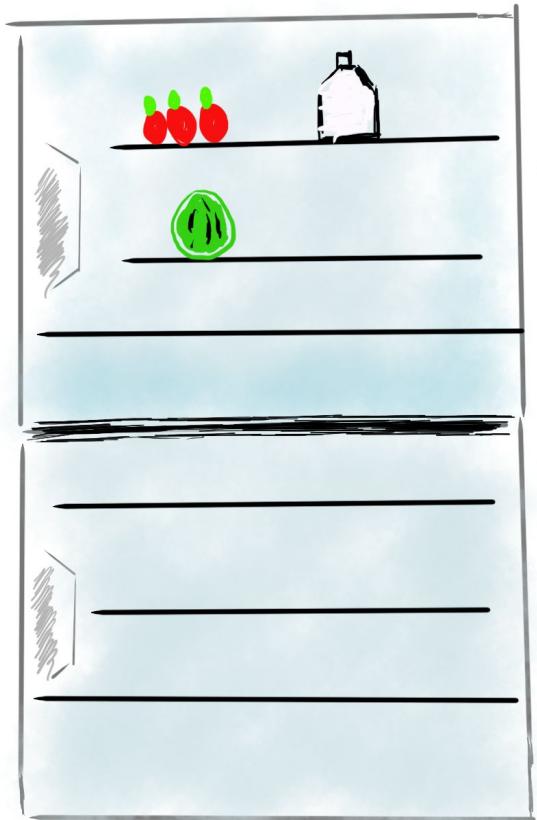
- Get stats about the calories in food item
- Show healthy recipes and meal options

CONCEPT EXPLORATION

Sketching

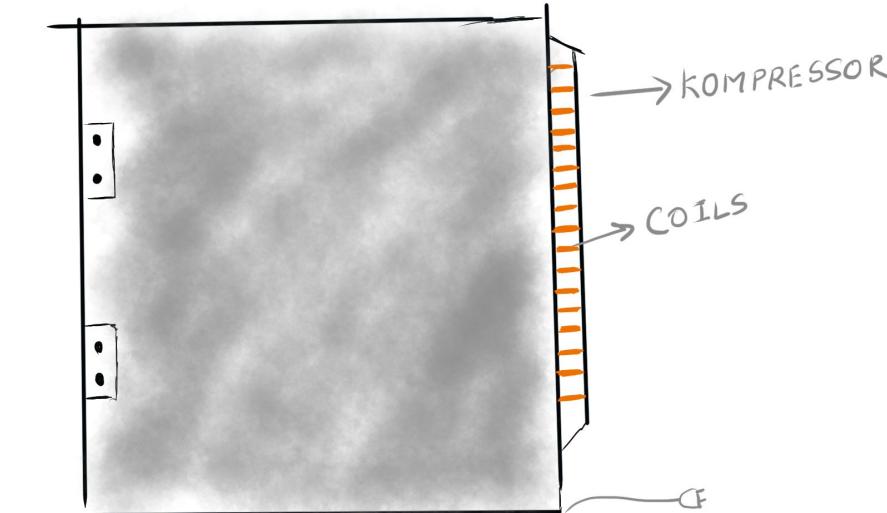
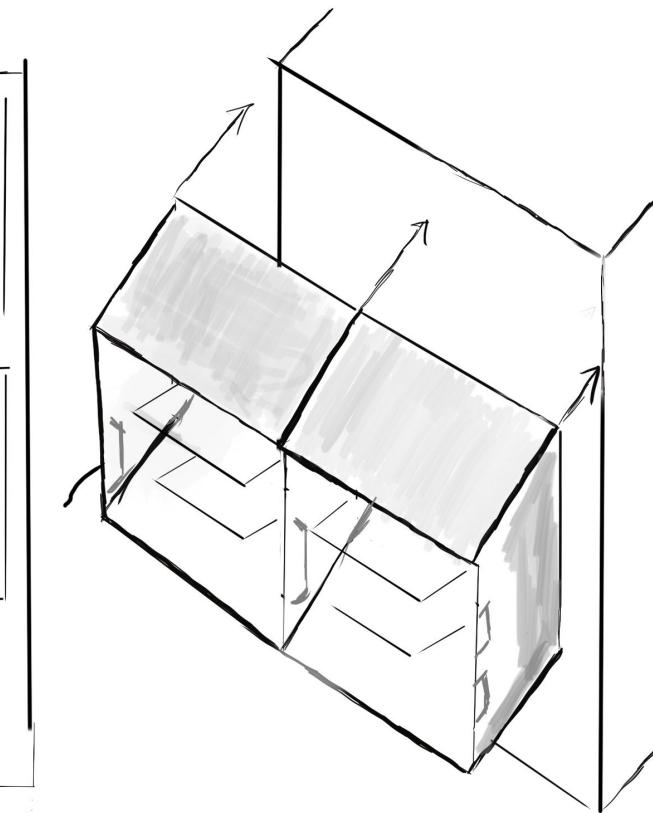
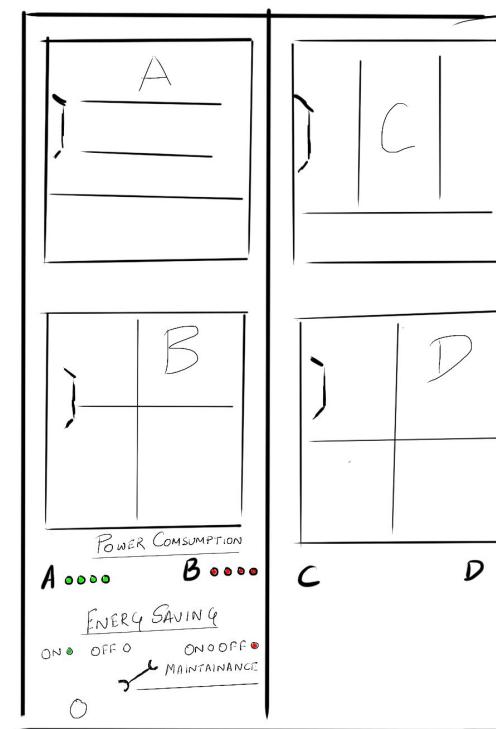


TYPES OF CONTAINERS



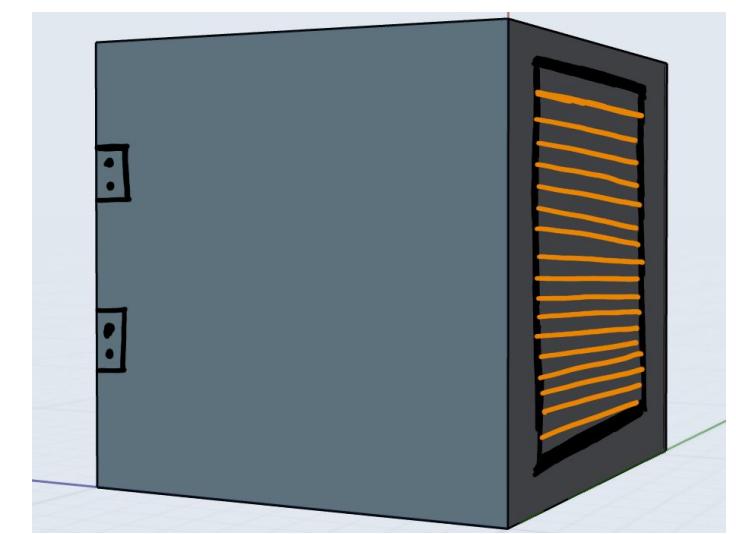
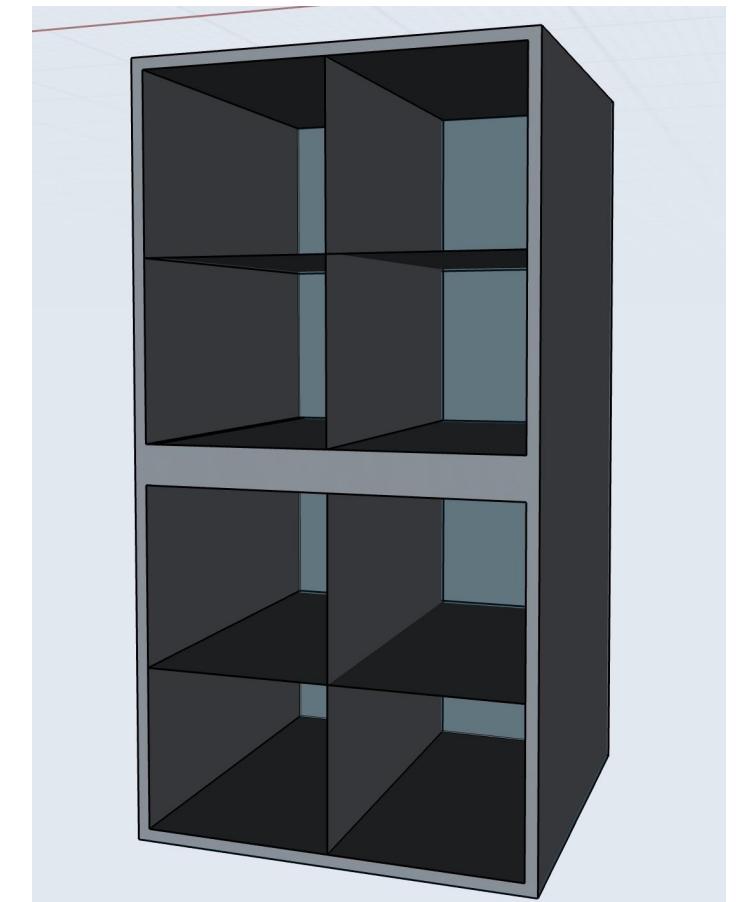
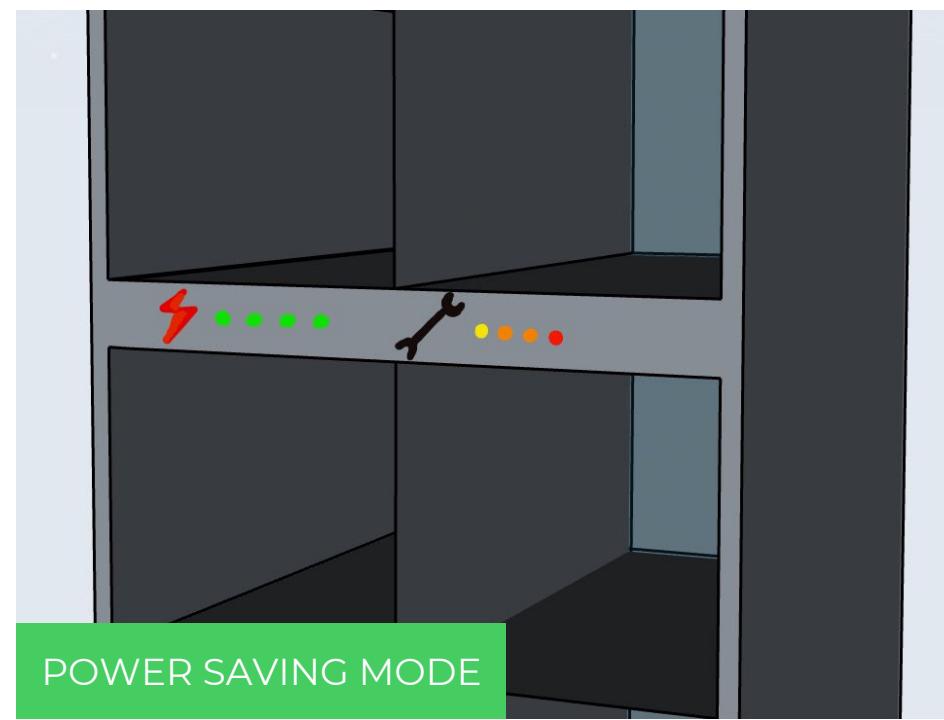
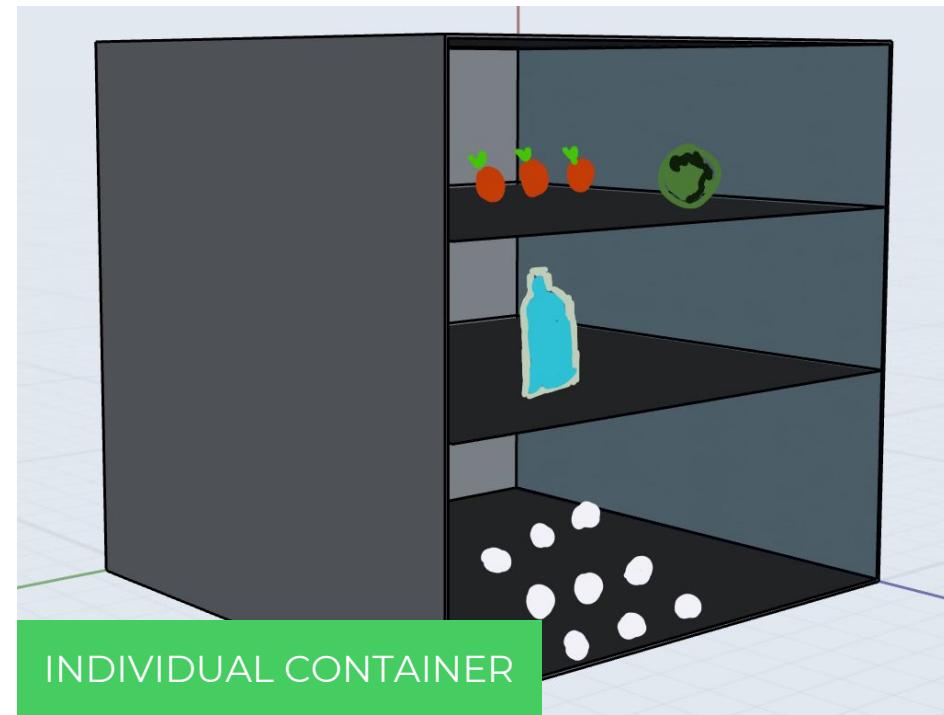
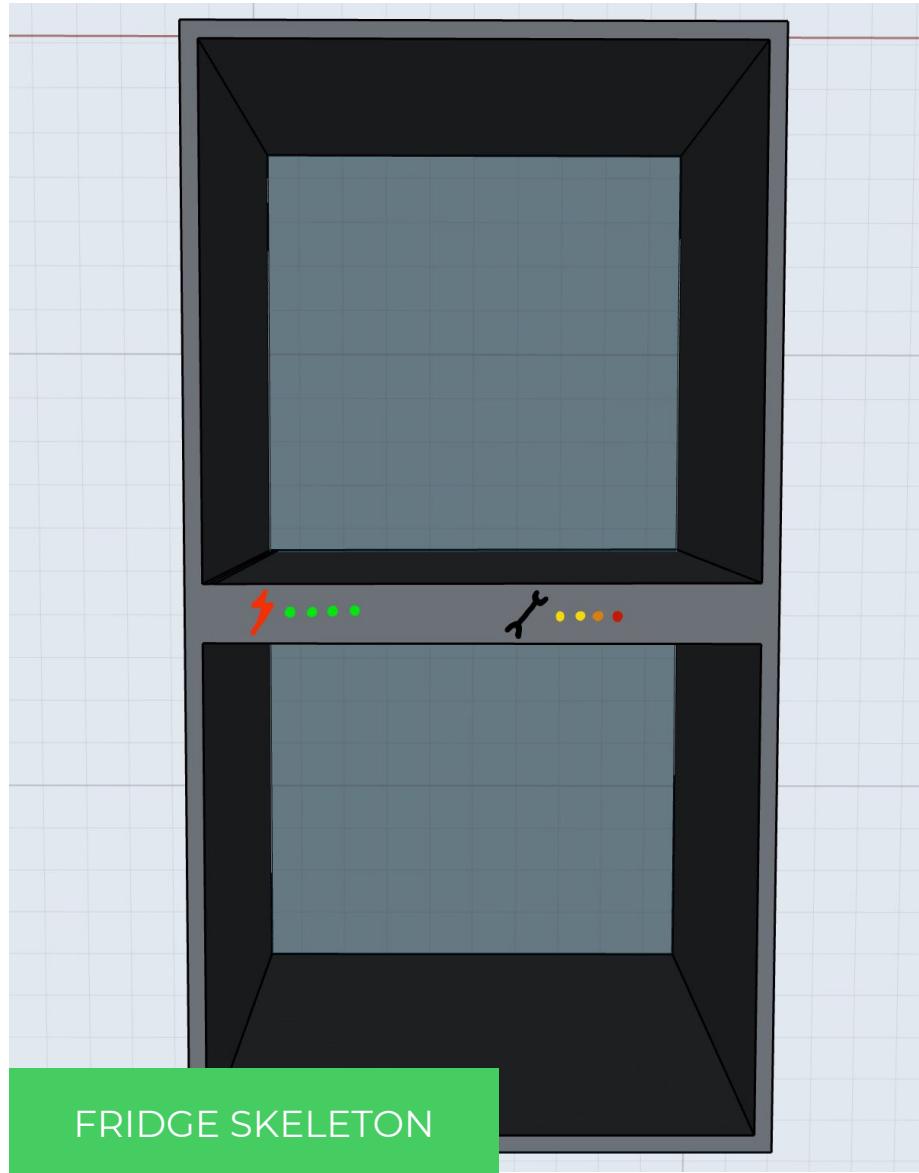
CONTAINER
A

CONTAINER
B

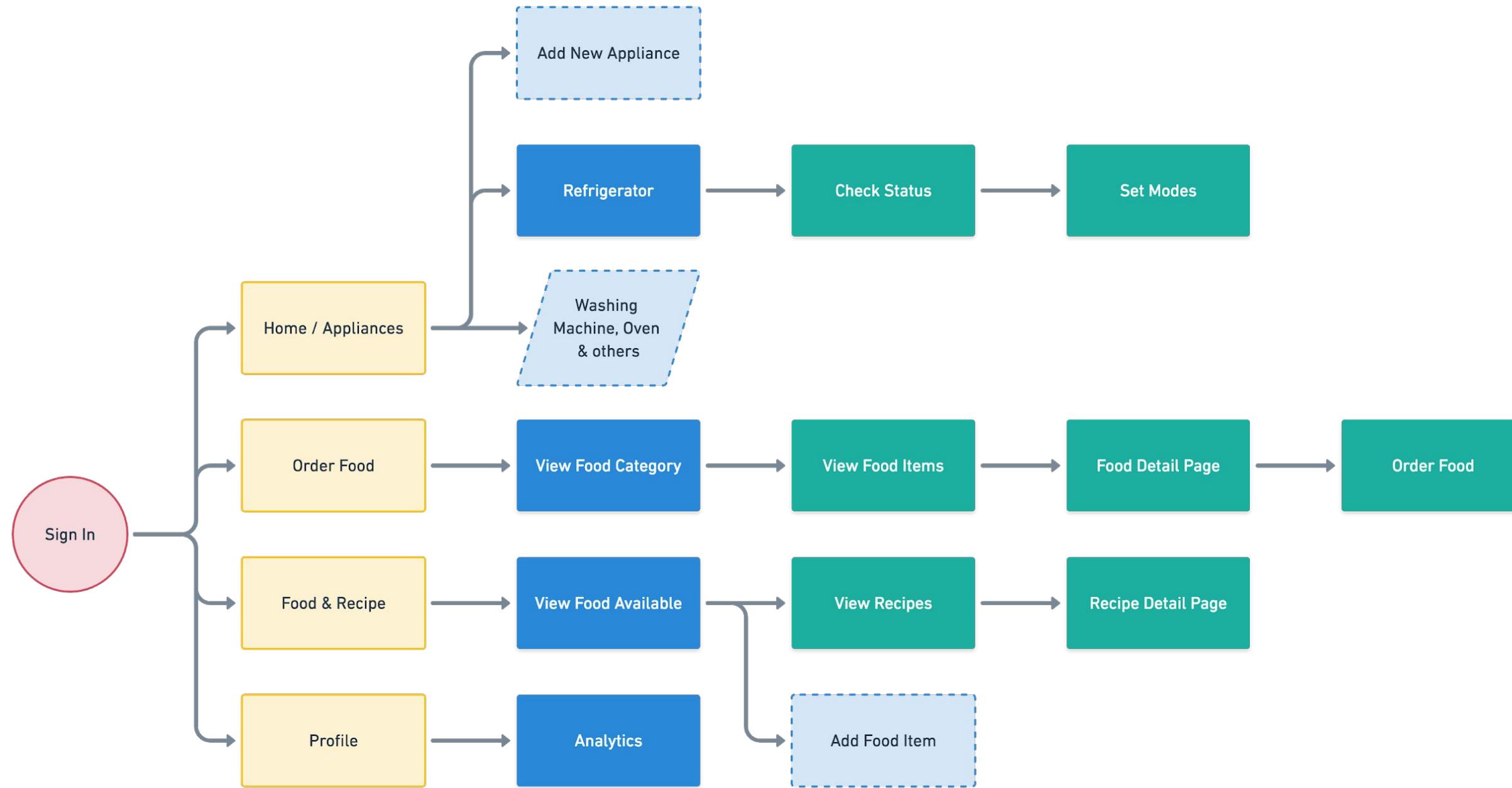


CONCEPT EXPLORATION

3D Designs

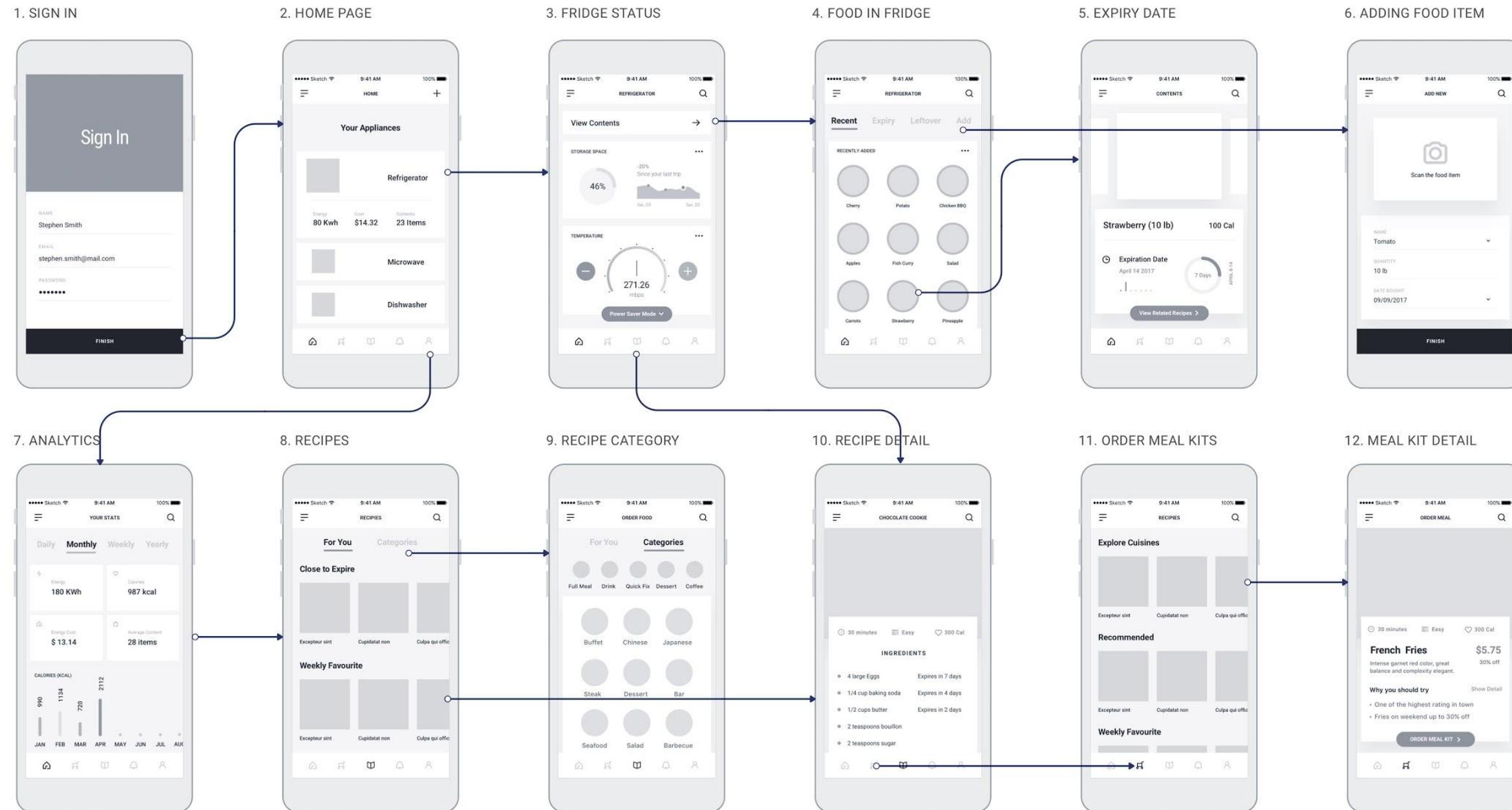


App Flow Diagram



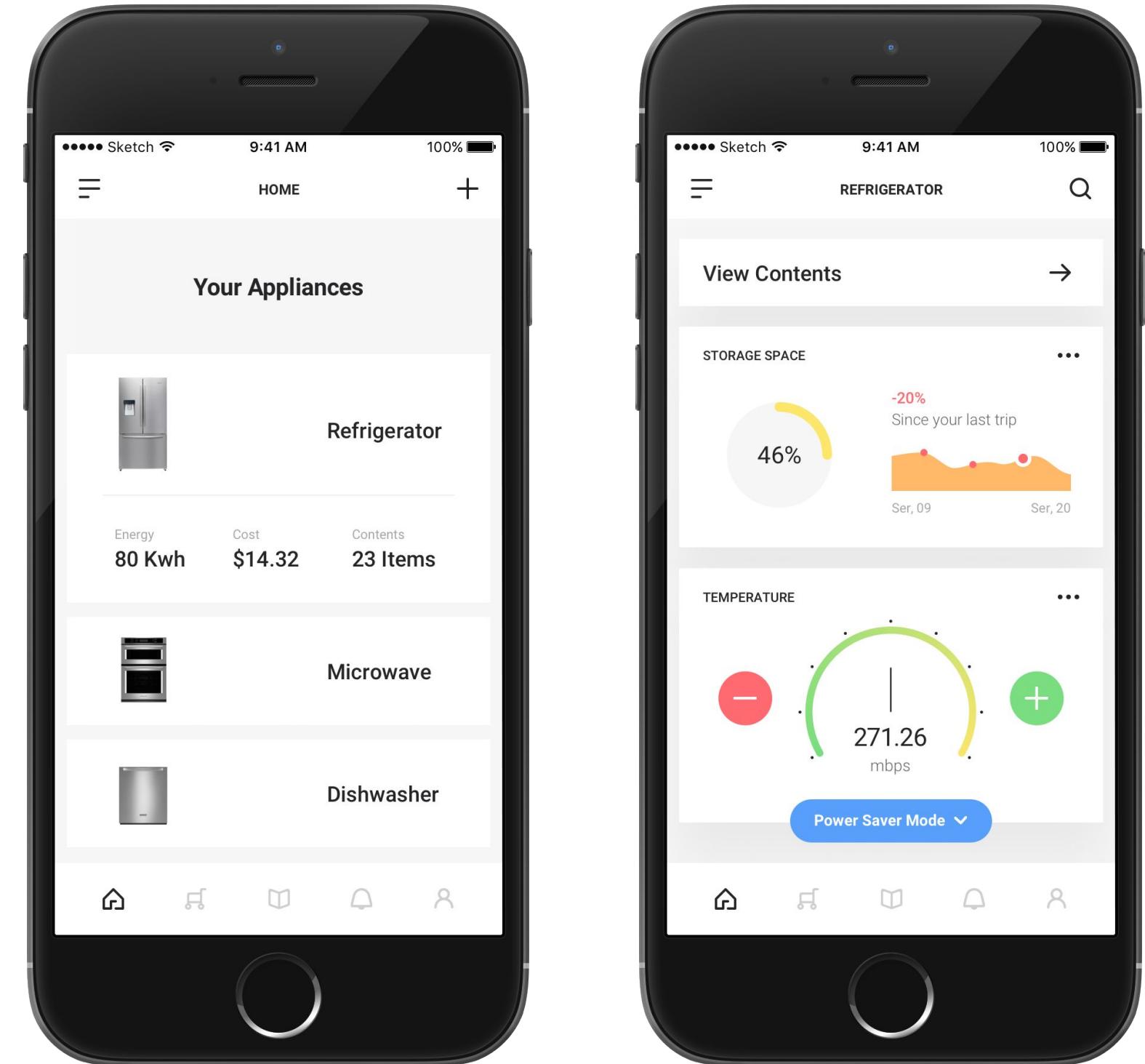
LOW FIDELITY DESIGN

Wireframing



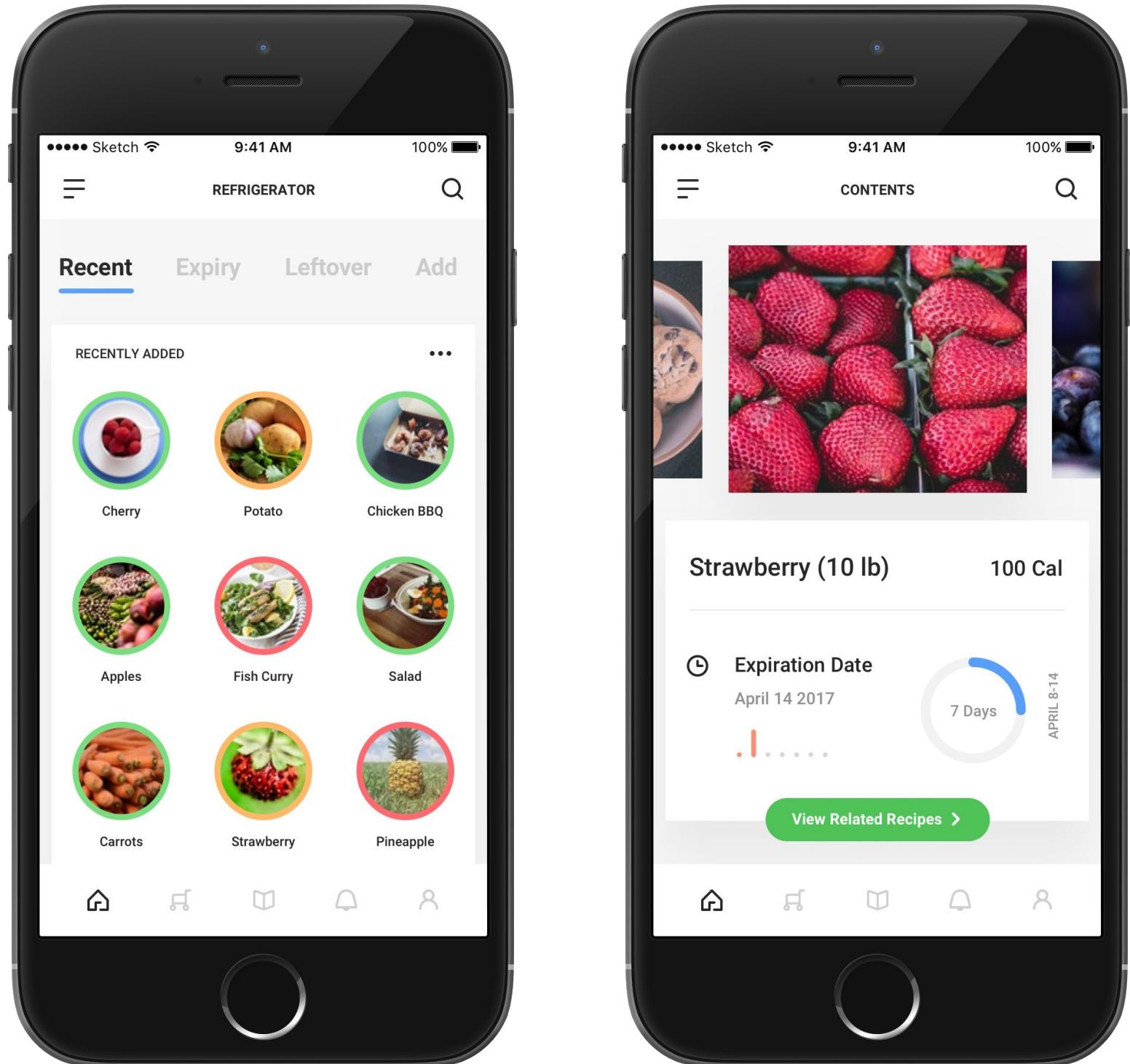
Connected Devices

HIGH FIDELITY DESIGN



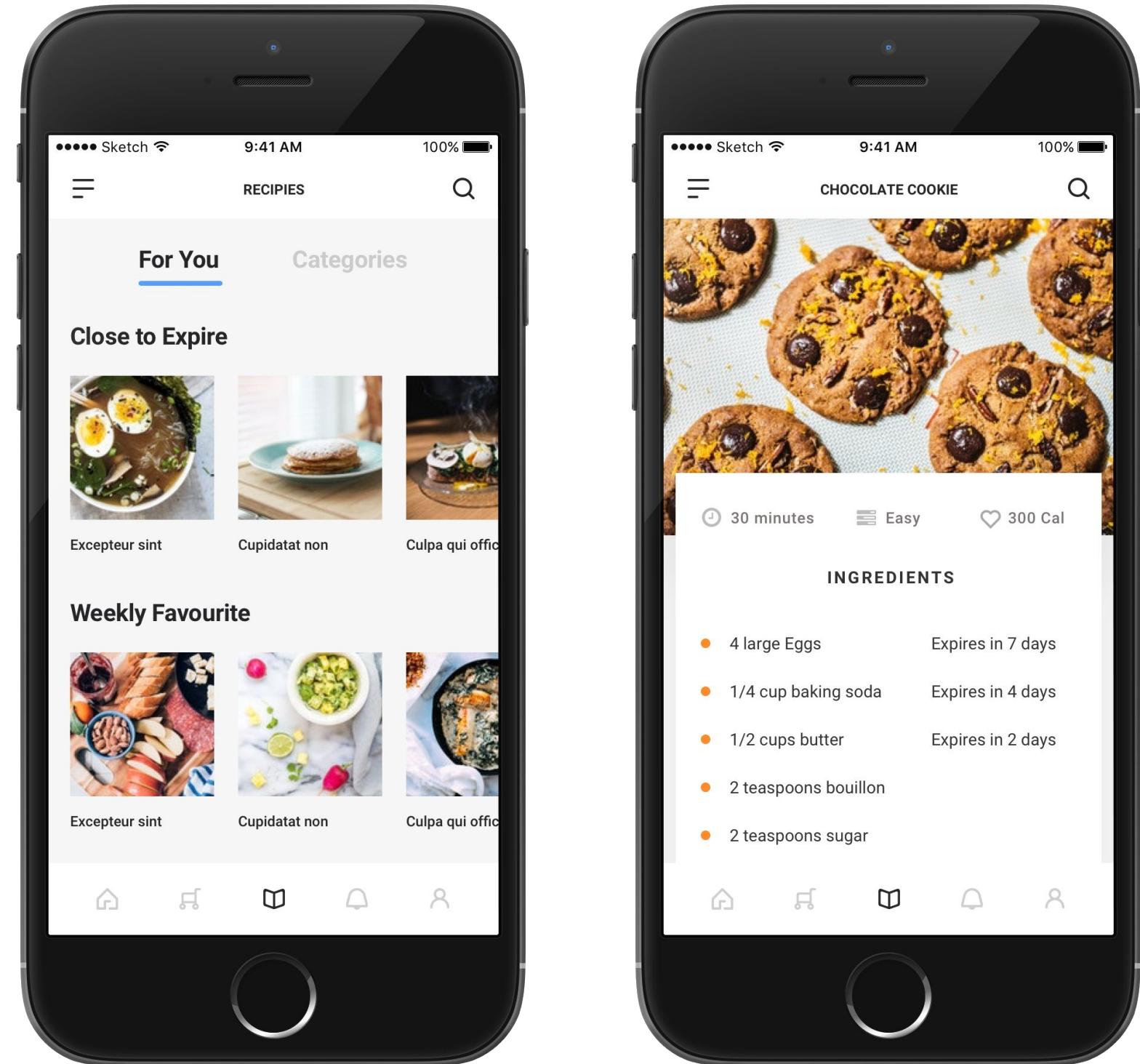
Manage Inventory

HIGH FIDELITY DESIGN



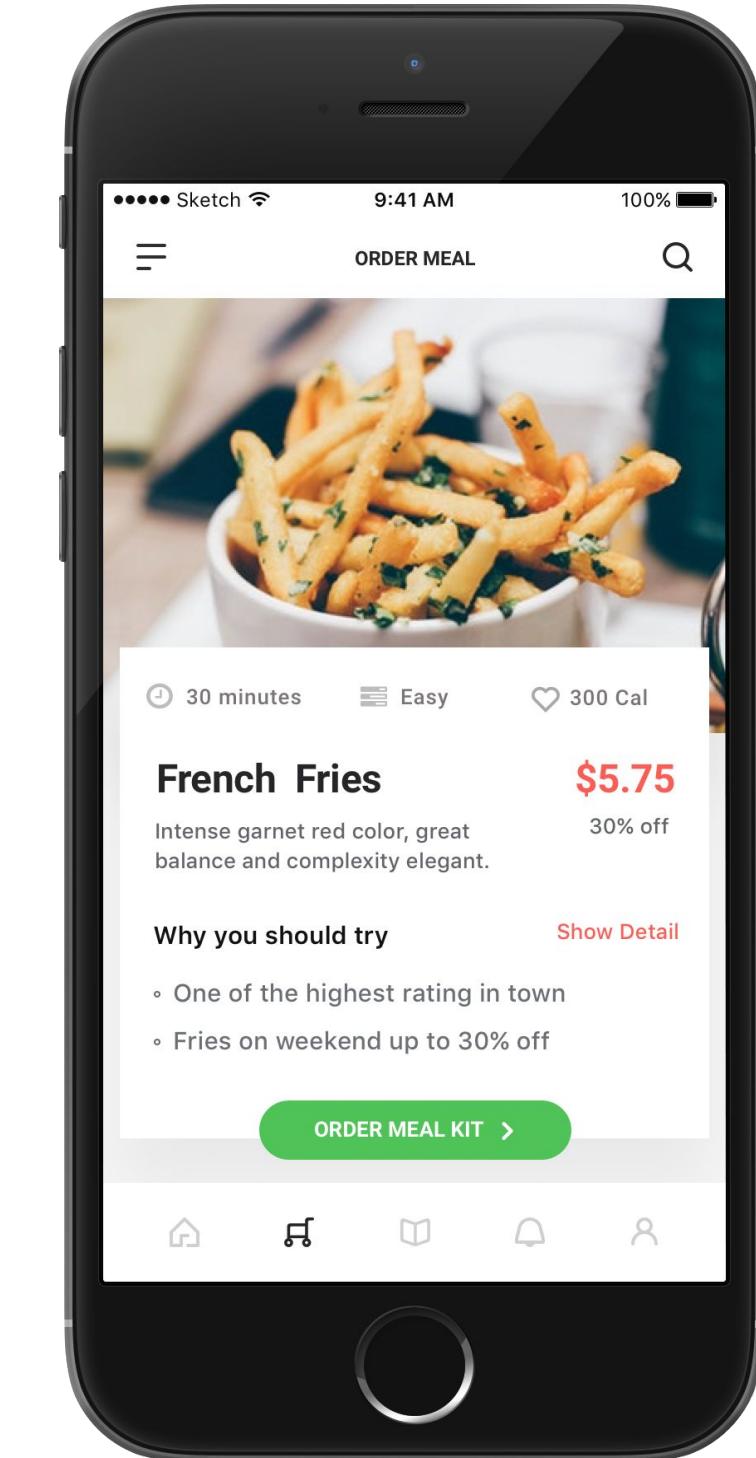
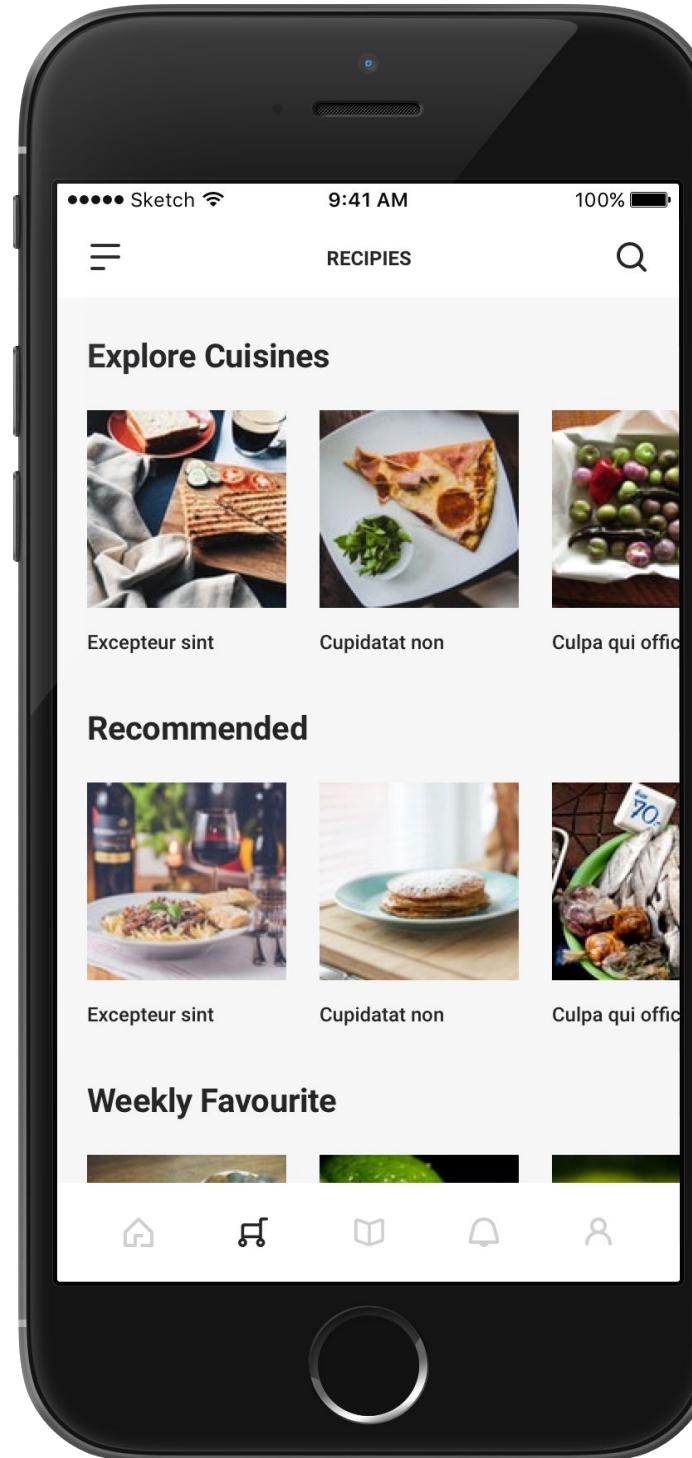
Personalized Recipes

HIGH FIDELITY DESIGN



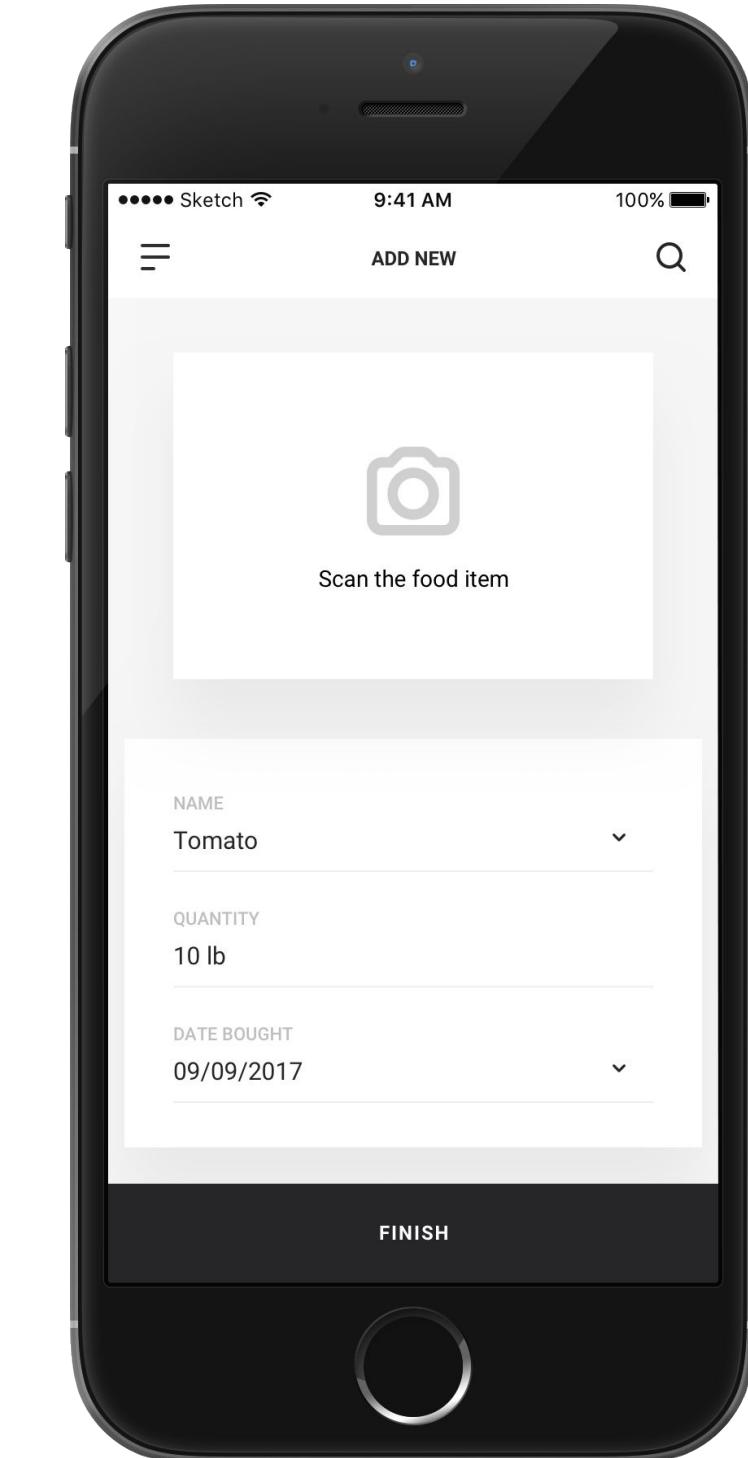
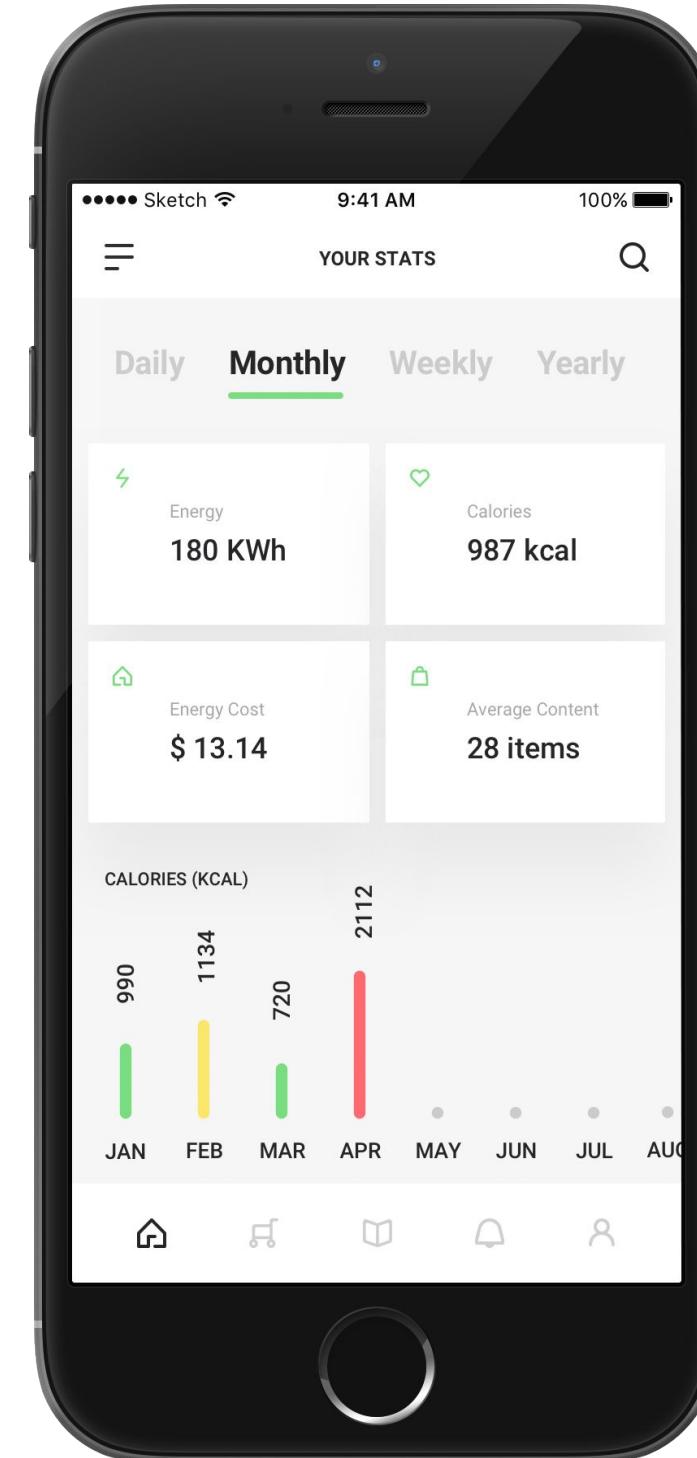
Order Meal Kits

HIGH FIDELITY DESIGN



Health Statistics

HIGH FIDELITY DESIGN



PRODUCT STRATEGY

Business Model

Key Partners	Key Activities	Value Proposition	Customer Relationships	Customer Segments
Universities Home Builders Online Stores Dealers & Retailers	Manufacturing Repair & Servicing Custom Designing Rental Services App development Marketing Products Supply Chain Management	Lower Price Manage Storage Food Recipes Fresh Food Less Wastage Power Efficiency Manage Grocery Health Statistics Customizable storage Portability Compatibility Ease of Use	Acquisition Retention Switching Cost Service and Repair Chat, Email & Call Warranty & Support	Stakeholders: Universities Home Builders Housing Societies Shared Hostels Users: Students Working Professionals People in Shared Spaces Travellers
Key Resources		Channels		
Manufacturing facilities Refrigerator Individual Compartments Plated for Meal Delivery GE Mobile App Human Resources		Universities stores Amazon.com Walmart GE Online Store Dealers & Retailers Other Online Stores		
Cost Structure	Revenue Streams			
Manufacturing Research & App Development Hiring & Training employees Service & Support	Distribution channels Discounts & Subsidies Repair & Rental Advertising & Marketing	Fridge Body Sales Compartment Sales Refurbish & Repair Service parts	Meal Kit Suscription Delivery Charges Rental Services In-App Advertising	



Thank You!